CLAIMS

1. A method of assigning values to parameters for IQ mismatch cancellation, comprising:

providing values to a processing path of a communication device;

passing the provided values through an IQ modulator, at least one non-linear element and an IQ demodulator, to produce distorted values; and

estimating at least one parameter for cancellation of IQ mismatch effects of the communication device responsive to the provided values and to the distorted values.

2. A method according to claim 1, wherein estimating the at least one parameter comprises estimating the at least one parameter responsive to the provided values and to the distorted values, without additional values passed through a sub-group of the IQ modulator, the at least one non-linear element and the IQ demodulator.

3. A method according to claim 1, wherein estimating the at least one parameter comprises estimating at least one parameter, respectively, for each of the IQ modulator and the IQ demodulator.

4. A method according to claim 1, wherein passing the values through the IQ modulator and the IQ demodulator comprises passing the values through the IQ modulator in the processing path and through an IQ demodulator in a reverse path of the communication device.

5. A method according to claim 1, wherein passing the values through at least one non-linear elements comprises passing the values through a power amplifier.

6. A method according to claim 1, wherein providing values to a processing path of a communication device comprises providing values to a processing path of a transmitter.

7. A method according to claim 1, wherein estimating the at least one parameter comprises accumulating a predetermined number of pairs of provided values and respective distorted values and estimating from the accumulated pairs.

8. A method according to claim 7, wherein the communication device comprises a transmitter and accumulating a predetermined number of pairs comprises accumulating a number of pairs transmitted during a single transmission slot.

9. A method according to claim 1, wherein passing the values through elements to produce distorted values comprises passing also through at least one multiplier which performs IQ mismatch cancellation based on current values of the at least one parameter which is to be estimated.

10. A method according to claim 9, wherein estimating the at least one parameter comprises determining a next step correction of the current value of the at least one parameter.

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11. A method according to claim 1, comprising repeating the estimating of the at least one parameter a predetermined number of repetitions.

12. A method according to claim 1, comprising retrieving from storage initial values of the at least one parameter.

13. A method according to claim 1, comprising storing the estimated value of the at least one parameter for later use.

14. A method according to claim 1, wherein providing the values to the processing path comprises providing values generated for the IQ mismatch cancellation method.

15. A method according to claim 1, wherein providing the values to the processing path comprises providing values generated without relation to the IQ mismatch cancellation method.

16. A method according to claim 1, wherein passing the provided values through the at least one non-linear element comprises passing the values through at least one non-linear element which has a gain which depends on the magnitude of its input signal.

17. A method of assigning values to parameters for IQ mismatch cancellation, comprising:

estimating a complex-valued base band equivalent gain of an amplification unit of a communication device;

approximating values of one or more matrices representing an IQ mismatch effect of the communication device based on current values of at least one parameter for cancellation of the IQ mismatch effect; and

selecting a next step value of the at least one parameter for cancellation of the IQ mismatch effect, which next step values minimize a cost function which depends on values passed through the communication device and depends on the estimated complex-valued gain and the approximated one or more matrices.

18. A method according to claim 17, wherein estimating the complex valued gain comprises estimating separately for each value passed through the communication device.

19. A method according to claim 17, wherein estimating the complex valued gain comprises estimating once for a plurality of accumulated values passed through the communication device.

20. A trainer for an IQ mismatch cancellation unit of a communication device including at least an IQ modulator and an IQ demodulator along a sequential path, comprising:

a first input adapted to receive values from before an entrance to the first of the IQ modulator and the IQ demodulator along the sequential path;

a second input adapted to receive values from after an output of the last of the IQ modulator and the IQ demodulator along the sequential path; and

a determination unit adapted to determine at least one parameter of the cancellation unit responsive to values on both the first and second inputs.

21. A trainer according to claim 20, wherein the trainer does not have inputs from any point between the IQ modulator and the IQ demodulator.

22. A trainer according to claim 20, wherein the sequential path includes a non-linear element between the IQ modulator and the IQ demodulator.

23. A trainer according to claim 20, wherein the determination unit is adapted to determine a corrected value of the at least one parameter which minimizes a cost function based on values received from both the first and second inputs.

24. A trainer according to claim 20, wherein the determination unit is adapted to determine at least one parameter for each of at least two cancellation units.

25. A trainer according to claim 20, wherein the determination unit is adapted to determine the at least one parameter iteratively.

26. A transmitter, comprising:

an IQ modulator;

an IQ demodulator adapted to receive values from after an output of the modulator;

mismatch adjustment circuitry adapted to compensate for mismatch effects of the modulator; and

a mismatch trainer adapted to adjust at least one parameter of the mismatch adjustment circuitry responsive to values entering the modulator and respective values from the output of the demodulator.

27. A transmitter according to claim 26, wherein the demodulator is part of a reverse conversion path of the transmitter.

28. A transmitter according to claim 26, comprising a power amplifier between the modulator and the demodulator.

29. A transmitter, comprising:

an IQ modulator;

a predistorter adapted to predistort values entering the modulator;

a predistorter trainer adapted to adjust parameters of the predistorter;

mismatch adjustment circuitry adapted to adjust signals entering the IQ modulator in order to cancel mismatch effects of the modulator;

a mismatch trainer adapted to adjust at least one parameter of the mismatch adjustment circuitry; and

a feedback conversion unit adapted to convert signals which passed through the IQ modulator back to base band and to provide the converted signals to the mismatch trainer and the predistorter trainer.

30. A transmitter according to claim 29, comprising a power amplifier adapted to receive signals from the IQ modulator and wherein the feedback conversion unit is adapted to convert to base band, signals which passed through the power amplifier.

31. A transmitter according to claim 29, wherein the feedback conversion unit comprises a demodulator and a mismatch multiplier of the demodulator and the mismatch trainer is adapted to adjust parameters of the mismatch multiplier of the demodulator.

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32. A transmitter according to claim 29, wherein the mismatch adjustment circuitry comprises a matrix multiplier.

33. A transmitter according to claim 29, wherein the mismatch trainer is adapted to adjust the at least one parameter of the mismatch adjustment circuitry iteratively.

34. A transmitter according to claim 29, comprising a processor which includes the predistorter, the predistorter trainer, the mismatch adjustment circuitry and the mismatch trainer.

35. A method of assigning values to parameters for IQ mismatch cancellation of a transmitter, comprising:

transmitting values by the transmitter;

estimating at least one parameter for cancellation of IQ mismatch effects of the transmitter responsive to the values transmitted during a first period; and

adjusting the at least one parameter estimated responsive to the values transmitted during a first period responsive to values transmitted during a second period, which second period is separated from the first period by a rest period in which the transmitted values are not used to adjust parameters for IQ mismatch cancellation.

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36. A method according to claim 35, wherein the values transmitted during the rest period are used for adjusting a predistorter of the transmitter.

37. A method according to claim 36, comprising adjusting the predistorter based on values transmitted before the first period.